

**REMARKS/ARGUMENTS**

Favorable reconsideration of this application in light of the following discussion is respectfully requested.

Claims 7-25 are presently active, Claims 1-6 have been previously canceled without prejudice,

In the outstanding Office Action, Claims 9, 19, and 21 were objected to due to informalities. Claims 7-18 were rejected under 35 U.S.C. § 103(a) as unpatentable over Higuchi et al (U.S. Pat. No. 4,293,357) and in view of Gadkaree (U.S. Pat. Appl. Publ. No. 2002/0011683). Claims 18-25 were rejected under 35 U.S.C. § 103(a) as unpatentable over Higuchi et al and in view of Gadkaree.

**Claim Summary:** Independent Claim 7 defines a honeycomb structural body including:

a ceramic block made by arranging a plurality of through-holes side by side in a longitudinal direction through partition walls and sealing either one end portions of the through-holes,

wherein *the ceramic block comprises a composite material comprising ceramic particles and amorphous silicon.*

Independent Claim 13 defines a honeycomb structural body including:

a ceramic member having a plurality of through holes that are placed in parallel with one another in a length direction with partition wall interposed therebetween and are sealed at either one end portions of the through holes,

wherein *the ceramic member comprises a composite material including ceramic particles and amorphous silicon.*

Independent Claim 19 defines a honeycomb structural body including:

a plurality of ceramic members combined with one another, the ceramic members each having a plurality of through holes extending in parallel with one another in a length direction with partition wall interposed therebetween and are sealed at either one end portions of the through holes,

wherein ***the plurality of ceramic members each comprise a composite material including ceramic particles and amorphous silicon.***

Thus, these independent claims define that the composite material of the honeycomb structural body includes amorphous silicon. The specification describes that, by the ceramic block including a composite material comprising ceramic particles and amorphous silicon, when the thermal stress is applied, even if fine cracks are created between ceramic particles, the growth of the cracks can be prevented.<sup>1</sup>

**Regarding the art rejections:** The outstanding Office Action acknowledged that Higuchi et al do not teach the use of amorphous silicon in the forming of a ceramic block (Office Action at page 3, lines 7-8). Thereafter, the outstanding Office Action relies on Gadkaree to remedy the deficiencies of Higuchi et al, stating that Gadkaree teaches that it is known to construct a ceramic honeycomb structure with amorphous silicon as well as silicon carbide. See Office Action at page 3, lines 7-8. The Office Action relies specifically on numbered paragraphs 26 and 30 and the Abstract of Gadkaree for this conclusion.

More specifically, the Office Action indicates on page 3 that, “while the teachings of Gadkaree may teach the use of amorphous silicon may be undesirable, it definitely states that amorphous silicon is a known material to use in the construction of a honeycomb structure.” On this basis, the Office concludes that the independent claims are obvious.

Applicant takes exception to this conclusion of obviousness.

First of all, Gadkaree without question describes in numbered paragraph that the use of amorphous silicon ***is*** undesirable. Specifically, Gadkaree describe:

[0026] It is ***preferred that the silicon powder be comprised of a crystalline silicon powder.*** It has been found that ***the use of amorphous silicon metal powder in the subsequent formation process, as is standard in***

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<sup>1</sup> The specification at page 7, lines 9-12.

***the prior art, results in an aqueous system that typically is subject to a reaction, and resultant foaming, between the silicon and water which is used as the preferred solvent for the resin. This foaming is particularly undesirable*** when forming honeycomb, or similar-type filtration structures, as it makes it particularly difficult to form structures exhibiting controlled wall uniformity, porosity and microstructure; i.e., difficulty in forming ceramic bodies exhibiting the narrowed pore size distribution desired for filtration applications. ***It has been surprisingly found that the use of powdered crystalline silicon does not result in presence of foaming reactions when utilized in an aqueous system.*** As such, the use of crystalline silicon powder, in turn, allows use of water as the solvent and in the formation of an aqueous system. In short, the SiC formation process is ***much simpler, more economical, as water is an inexpensive solvent and requires no post formation handling or disposal of resultant water vapor.*** [Emphasis added.]

Thus, one of ordinary skill in the art at the time of the invention would have known that amorphous silicon powder is not preferred in the fabrication proceedings. Moreover, for all these reasons identified by Gadkaree (simplicity, economy, safety, and no post handling or disposal), one of ordinary skill in the art at the time of the invention would have chosen silicon powder not amorphous silicon powder as the silicon constituent to be fired in a honeycomb structure.

Second of all, in reconsidering the question of obviousness, the examiner will appreciate that the facts here are similar to those in *United States v. Adams*, 383 U. S. 39, 40 (1966) referenced in *KSR International Co. v. Teleflex Inc. et al.* 2007 U.S. LEXIS 4745. The Court stated therein that:

In *United States v. Adams*, 383 U. S. 39, 40 (1966), a companion case to *Graham*, the Court considered the obviousness of a wet battery that varied from prior designs in two ways: ***It contained water, rather than the acids conventionally employed in storage batteries; and its electrodes were magnesium and cuprous chloride, rather than zinc and silver chloride.*** The Court recognized that when a patent claims a structure already known in the prior art that is altered by the mere substitution of one element for another known in the field, the combination must do more than yield a predictable result. 383 U. S., at 50-51. It nevertheless rejected the Government's claim that Adams's battery was obvious. The Court relied upon the corollary principle that ***when the prior art teaches away from combining certain known elements, discovery of a successful means of combining them is more likely to be nonobvious.*** *Id.*, at 51-52. When Adams designed his battery, *the*

***prior art warned that risks were involved in using the types of electrodes he employed.*** The fact that the elements worked together in an unexpected and fruitful manner supported the conclusion that Adams's design was not obvious to those skilled in the art. [Emphasis Added.]

Here, for the facts of this situation, Gadkaree clearly teaches away from the use of amorphous silicon, Gadkaree clearly warns of risks and disadvantages in using amorphous silicon, and Applicant's use of amorphous silicon works together in what appears to be an unexpected and fruitful manner. The specification states on page 45 that:

As explained above, the honeycomb structural body according to the invention is constituted with a composite member consisting of ceramic particles and amorphous silicon, and can favorably mitigate an internal stress at bonding points between ceramic particles (amorphous silicon) even when a large compression strength is applied to cause a large internal stress in the inside, so that the durability is excellent without generating cracks.

In other words, the persistence of the amorphous silicon phase between the ceramic particles provides for resistance to cracking, which Applicant's demonstrate in Tables 1 and 2 are problems when the resultant honeycomb structural body does not include amorphous silicon. These results are not found or suggested in the art of record.

Last of all, the examiner cites to *In re Boe* 355 F.2d, 148 USPQ as supporting his position by which he discounts teaching away of Gadkaree. Yet, the Federal Circuit in *In re Braat*, 918 F.2d 185, 16 U.S.P.Q. 2d 1812, 1814 distinguished *In re Boe* for use in an obviousness rejection. There, the Court stated that:

The Board cited *In re Boe*, as noted above, to support its obviousness rejection. In that case, however, the suggestion of practicing the claimed invention in a particular way was more of an embodiment than a teaching away. 355 F.2d at 963, 148 USPQ at 509 ("the pore-forming materials can be added with the lattice-forming [sic] materials") (emphasis added). Here, Uehara strongly suggests not to unite the glass and plastic lenses.

Also, in *Boe*, if the claimed invention were utilized in the nonpreferred way suggested in the prior art reference, problems would occur.

There, the Court held *Braat*'s claims to be non-obvious gives strong suggestion not to unite the glass and plastic lenses.

In light of the Federal Circuit's clarification of the application of *In re Boe*, Applicant submits that the examiner's reliance on *In re Boe* is much like the Board's improper reliance in *In re Braat*, and therefore the present claims should be found non-obvious given the strong teaching away in Gadkaree.

Thus, for all these reasons, the 35 U.S.C. § 103(a) rejection over Higuchi et al and Gadkaree should be removed and the claims passed to allowance.

Accordingly, Claims 7 and 19 (and the claims dependent therefrom) are believed from similar reasons to be allowable.

**Conclusion:** In view of the discussions presented above, Applicants respectfully submit that the present application is in condition for allowance, and an early action favorable to that effect is earnestly solicited.

Respectfully submitted,

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